89047

Page 1

- August-21-12 10:36:46 AM Item ID: D212-664-101 *N900040100* Accept Setup Start Revision ID: --Item Name: Crosstube Fwd High Start Oty: 1.00 **Start Date:** 21/08/2012 **Cust Item ID: Required Date:** 04/09/2012 Req'd Qty: 1.00 **Customer:** Reference: Run Process Plan: MIJ Date: 12/08/21 Tooling: Approvals: Date: Stop SPC (Y/N): Date: Date: Sequence ID/ **Operation** Set Up/ Tool ID Reject Tool # Plan Accept Reject Insp. **Work Center ID Description** Qty **Run Hours** Code Qty Number Stamp Draw Nbr **Revision Nbr** D212-664-141 Rev D (DEO) 100 0.00 DOCUMENT CONTROL *100* DC 0.00 Memo Document Control Photocopy bluefile and create labels as per PPP D212-664-101 CHG005 110 Pick Kit 0.00 12/8/21 Packaging *110* Packaging 0.00 Memo Packaging 120 0.00 BENDING MACHINE - CROSSTUBES *120* CNC Bend 2 0.00 Memo CNC Alpha 160 Bender Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio D212-664-101

											DQA:	Date:	
,NCR: Ye	es / · No		. :		::WC	DRK ORD	ER NON-	CONFORI	MANCE / UP	PDATE		•	•
	-							. *	_	***	QA Closed:	• Date:	
Work Or der	÷					DISPOS	SITION	2		AGAINST DE	PARTMENT	/PROCESS	*
Part No	D					,	Rework Scrap	-{ 1	Skid-tube Machining	Crosstube Small Fab	ł	Water Jet d. Eng. Coor	Engineering Quality
NCR No	o. <u> </u>	4.				Work Orde	Use-as-is r Update	Therr	noforming Large Fab	Finishing . Composite	Rec/Stor	re/Packaging Supplier	Other
Root	1	7		Descr	ription	of work ord	ler update	Initial	Ac	ction	Sign &	+	
Cause	Date	Step	Qty			-conforma		Chief Eng	4 Desc	cription ·	Date	Verification	QC Inspector
Doc/Data	\cdot				•								
Equip/Tooling Operator							100 mg (
Material						.0		:	•				1 1 1 1
Setup] '	*		نور		•		1	* 1. **				
Other ·	╛.				•					• •			
Process Supplier	- 1 m		n.gr.	1.5	è	6		3					
Training			ļ, `					· 18				•	
Unapproved	<u> </u>		سعند	-	· · · · · · · · · · · · · · · · · · ·		* - 4 **			1. 1. 1.			•
						<i></i>	· •	AULT CATE	GORY 5:				
Landing	_		•			Genera	l ·	- **		· · · · · · · · · · · · · · · · · · ·			a
	Bending				Bend	**		Grain	The second	and the same	Ovalized		Pressure/Forced
	Centre N	ot Concer	ntric to	o/s	 '	/Route		Hardwa			ન •	tolerance -	Temperature/Cure
	Cracks			-	Broke	en/Damage	ed	—	ion Incomplete	The second secon	Part Incorre	—	Weld .
	Crushed/	Crimped.	7		Burrs			Instruct	ions Incomplete,	/Unclear	Part Lost/M	issing	Wrong Stock Pulled

Maintenance

Mislabeled

Misread Offset

Out of Calibration

Out of Sequence

Outside Dimensions

Contamination

Countersink

Cut Too Short

Drill Holes

Drawing

Finish

Folio

Part Moved

Positioned Wrong

Other

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Cuffs

Heat Treat

Inspection Strip in Tube

Torque Waves in Extrusion

Work Order ID 89047

89047

Item/Da Revision IDa	D212-664-10)1		Accept	*N900	0401	100)* s	etup Start	*N:	S1*
	Crosstube Fwo	d High							Stop	*N:	S2*
Start Date:	21/08/2012	Start Qty: 1.00	*1*	•	Cust Item I	D:					
Required Date:	04/09/2012	Req'd Qty: 1.00	*1*	Z	Customer:				•	•	
Reference:					•						4
Approvals:	Process Pla	n:	Date:	Tooling:	Da	 ite:		R	tun Stari	171	R1*
	QC:		Date:	SPC (Y/N):	Da	ite:		٠,	Stop	*N	R2*
Sequence ID/ Work Center II)	Operation Description		Set Up/ Run Hours	Tool ID		Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130		QC15- Crosstube Dimen	sional Check	0.00	, _{~1} ,				4		
<u>*130*</u>	•	•		16	7 (25/7)						
QC		Memo	•	0.00	0 (2010)						
Quality Control								•			*
		•		ı		•					
140		·		0.00							
140		Crosstubes						•		•	•*
Crosstubes		Memo		0.00	. (· · · · · · · · · · · · · · · · · · ·		•	
Crosstubes				wg D212-664-141 using drill . set-up towers in hole #7 as per		KN	1	12-	8-22	_ ′ .	
		DT8548 & I		as per Dwg D212-664-141usii ions between holes, both sides les.							
		3-Scribe par	t # and batch # using v	vibrating stylus as per Dwg D2	12-664-141						
				WHEN HANDLING CROSST pair damage within limits as p		7 m	0	/2	18/23		

		DQA:	Date:	
ICR: Yes / No	WORK ORDER NON-CONFORMANCE / UPDATE			

					<u> </u>				QA Closed:	Date	•
Work Orde	er:				DISPOSITION			AGAINST DE	PARTMENT	/PROCESS	
Part N	lo				Rework Scrap Use-as-is	The	Skid-tube Machining moforming	Crosstube Small Fab Finishing		Water Jet d. Eng. Coor. e/Packaging	Engineering Quality Other
NCR N	lo				Work Order Update		Large Fab	Composite	, Rec/3tol	Supplier	
Root				Descri	ption of work order update	Initial	Α	ction	Sign &		
Cause	Date	Step	Qty		or Non-conformance	Chief En	g Des	cription	Date	Verification	QC Inspector
Doc/Data											
Equip/Tooling											
Operator											
Material											
Setup		İ									
Other											
Process											
Supplier	_										
Training											
Unapproved											
					F	AULT CAT	EGORY				
Landir	ng Gear				General			, —-	-		
	Bending			ļ	Bend	Grain			Ovalized		Pressure/Forced
	Centre No	ot Concer	ntric to (D/S	BOM/Route	Hardv	are		Over/Under	tolerance	Temperature/Cure
	Cracks				Broken/Damaged	Insped	tion Incomplete		Part Incorre	ct	Weld
1	Crushed/0	Crimped.		_	Burrs	Instru	ctions Incomplete	e/Unclear	Part Lost/Mi	ssing	Wrong Stock Pulled
1	Cuffs				Contamination	Main	tenance		Part Moved		
	Heat Trea	t			Countersink	Mislat	eled		Positioned V	Vrong	_
	Inspection		Tube		Cut Too Short	Misre	ad		Power Loss/	Surge	Other
ļ	Ripples in				Drill Holes	Offset					
	Torque W	aves in E	xtrusion	٠ <u>ل</u>	Drawing	Out of	Calibration				
	Turning So	equence			Finish	Out o	Sequence				
Ì	Wave/Tw	ist in Tub	e		Folio	Outside Dimensions					

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August-21-12	10:36:46 AM			1							
Item ID: Revision ID:	D212-664-10	01		Accept)* s	etup Start	1/2/1				
Item Name:	Crosstube Fw	d High							Stop	*N.	S2*
Start Date: Required Date	21/08/2012 e: 04/09/2012	Start Qty: 1.00 Req'd Qty: 1.00	*1* *1*		Cust Item ! Customer:	ID:					
Reference: Approvals:	Process Pla	ın:	Date:	Tooling:		ate:		R	kun Star	' *N	R1*
•	QC:		Date:	0		ate:		·	Stop	*N	R2*
Sequence ID/ Work Center	ID	Operation Description		Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150		QC5- Inspect part comp	leteness to step on W/O	0.00					-		_
150		Memo		0.00	7/08/74						
Quality Control		*** WEAR	LATEX GLOVES WHEN	HANDLING CROSSTUE	3E***						
160				0.00							1
160								i			M11083
HandFXtube		Memo		0.00		•		+	,		.,-1
Hand Finishing Cr	rosstubes	*** WEAR	LATEX GLOVES WHEN	HANDLING CROSSTU	3E***	•					
		1- CLEAN	CROSSTUBE WITH WAS	SH'N WIPE							
170		Outsource process - ND	T per QSI038 4.1	0.00				a (
170				0.00				٥	12/	08/D	70
Outsource2	NIDT	Memo	LATEVOLOUS DES	0.00	7 F. M. J. M.						
Outsource process	5 - ND1	*** WEAR	LATEX GLOVES WHEN	I HANDLING CROSSTU	3E***						
		Liquid Pene	trant Inspection as per QS	I 038							

Liquid Penetrant Inspection as per QSI 038 Issue P/O: 17755
LPI as per ASTM 1417 Level 2
Attach copy of NDT results to work order

												DQA:	Da	te:	
NCR: Yes / No WORK ORDER NON-CONFORMANCE / UPDATE															
												QA Closed:	Da	te:	
Work Orde	er:					DISPOSITION				AGAINST E	ÞΕ	PARTMENT/	PROCESS		
Part f	Part No					Scrap Machin Use-as-is Thermoforn			Skid-tube Machining noforming Large Fab	├──			Water Jet d. Eng. Coor. e/Packaging Supplier		Engineering Quality Other
Root					Descri	ption of work order update	ı	Initial	Acti	on		Sign &			
Cause		Date	Step	Qty		or Non-conformance	Ch	ief Eng	Descri	ption		Date	Verificatio	n	QC Inspector
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier															
Training Unapproved	Н						ļ			•					
опаррточец			<u> </u>		<u></u>	F	ΔΠ	T CATE	GORY		-				<u> </u>
Landi	ng G	 iear				General		- Crite	<u> </u>						
		Bending Centre No	ot Concer	ntric to	o/s	Bend BOM/Route		Grain Hardwa	re			Ovalized Over/Under	tolerance		Pressure/Forced Temperature/Cure
	\vdash	Cracks Crushed/0	_rimned		<u> </u>	Broken/Damaged Burrs	Inspection Incomplete Instructions Incomplete/Unclear					Part Incorred Part Lost/Mi		-	Weld Wrong Stock Pulled
	_	Cuffs	ompeu.		-	Contamination					Part Lost/Will	2211 R		I wording prock brilled	
-		Heat Trea	t			Countersink	H	Mislabe		-	Positioned Wrong				
		Inspection	Strip in	Tube		Cut Too Short Misread						Power Loss/	-		Other

Offset

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Torque Waves in Extrusion

Drill Holes

Drawing

Finish

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Hand Finishing Crosstubes

Item ID: Revision ID:	D212-664-10	01		Accept	N900	040	100) *	Setup S		I VI	S1*
Item Name:	Crosstube Fw	d High								Stop	*N:	S2*
Start Date:	21/08/2012	Start Qty: 1.00	*1*		Cust Item I	D:						
Required Date:	04/09/2012	Req'd Qty: 1.00	*1*		Customer:							
Reference:			•									•
Approvals:	Process Pla	an:	Date:	Tooling:	Da	ate:		1		Start	*N	R1*
	QC:		Date:	_ SPC (Y/N):	Da	ate:			\$	Stop	*N	R2*
Sequence ID/ Work Center II	D .	Operation Description		Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Rejec Qty		Reject Number	Insp. Stamp
180		Receive & Inspect for D	amage & Mat'l Certs	0.00					/	//	0.	- 1
1ጸበ		Packaging							/6	11	422	(1)
Packaging		Memo		0.00					1-4	7		
Packaging		Ensure copy	y of NDT results attached t	o work order.						•		
												1
190		QC5- Inspect part comp	leteness to step on W/O	0.00								Λ.
1 9 0				0.00				_\				W 12 08
QC		Memo	LATEN OF ONE ONE	0.00								•
Quality Control		*** WEAR	LATEX GLOVES WHEN	HANDLING CROSSTUBE**	r *				•			
		Inspect for	damage & ensure results ar	re as per Dwg D212-664-141					., i	,		
193		Crosstubes Chemical Co	onversion	0.00								
103 HandFXtube	-	Mama		0.00			1	(.)		7	% - 2	U ——

I- PRESSURE WASH AND THEN USE WASH'N WIPE TO CLEAN CROSSTUBE BEFORE CHEMICAL CONVERSION

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

NCR:	Yes	/ No				WORK ORDER NON-O	100	VFORM	MANCE / UP	DATE		•			
									·		_(QA Closed:	D	ate:	
Work Orde	er:					DISPOSITION				AGAINST D	ΕP	PARTMENT	PROCESS		
Part I						Rework Scrap Use-as-is Work Order Update			Skid-tube Machining noforming Large Fab	Crosstube Small Fab Finishing Composite			Water Je d. Eng. Coor e/Packaginţ Supplie	g	Engineering Quality Other
Root						otion of work order update	1	nitial		tion	T	Sign &			
Cause		Date	Step	Qty		or Non-conformance	Ch	ief Eng	Desci	ription	╛	Date	Verificati	on	QC Inspector
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training Unapproved															
						F.	AUL	T CATE	GORY						
Landi					_	General		1			_			_	,
	Bending Centre Not Concentric to O/S Cracks Crushed/Crimped. Cuffs Heat Treat			Bend BOM/Route Broken/Damaged Burrs Contamination Countersink		Grain Hardware Inspection Incomplete Instructions Incomplete/Unclear Maintenance Mislabeled				Ovalized Over/Under Part Incorred Part Lost/Mi Part Moved Positioned V	ct ssing Vrong		Pressure/Forced Temperature/Cure Weld Wrong Stock Pulled		
	\vdash	nspection	•	Tube	_	Cut Too Short		Misread	l			Power Loss/	Surge		Other
		Ripples in	Bend			Drill Holes	1	Offset							

Out of Calibration

Out of Sequence

Outside Dimensions

DQA:

Date:

Turning Sequence

Wave/Twist in Tube

Torque Waves in Extrusion

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

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Spray Painting

D212-664-101 Crosstube Fwd High				*N9000401					Start Stop	1 71	S1* S2*
	Start Qty: 1.00 Req'd Qty: 1.00	*1* *1*		Cust Item I Customer:	D:						
Process Pla QC:	n:		Tooling: SPC (Y/N):					Run	Start Stop	*N *N	R1* R2*
)	Operation Description OC7-Inspect Chemical C	Conversion Coat	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	-			Insp. Stamp
	Memo		0.00	**							1/12 08
	Spray Painting per QSI00 SprayPaint	05 4.2	0.00				AJ	12	-8-	-26	
	Crosstube Fwd 21/08/2012 04/09/2012 Process Pla	Crosstube Fwd High 21/08/2012 Start Qty: 1.00 04/09/2012 Req'd Qty: 1.00 Process Plan: QC: Operation Description QC7-Inspect Chemical C Memo *** WEAR	Crosstube Fwd High 21/08/2012 Start Qty: 1.00 *1* 04/09/2012 Req'd Qty: 1.00 *1* Process Plan: Date: QC: Date: Operation Operation QC7-Inspect Chemical Conversion Coat Memo *** WEAR LATEX GLOVES WHE	Crosstube Fwd High 21/08/2012 Start Qty: 1.00 *1* 04/09/2012 Req'd Qty: 1.00 *1* Process Plan: Date: Tooling: QC: Date: SPC (Y/N): Operation Set Up/ Run Hours QC7-Inspect Chemical Conversion Coat 0.00 Memo 0.00 **** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*	D212-664-101	D212-664-101	D212-664-101	D212-664-101	D212-664-101	D212-664-101	NO NO No No No No No No

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube as per DEO D212-667-141 with White Imron as per QSI 005 $4.2\,$

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

PRIME: 121746 Start Time: 7:00 Fininsh Time: 8:00

PAINT: 122381 Start Time: 4:00 Finish Time: 5:00

		•									DQA:	Date:	4 .
NCR:	Yes	/ No				WORK ORDER NON-O	COI	NFORM	MANCE / UP	DATE	QA Closed:	Date:	
Work Ord	er:					DISPOSITION				AGAINST DE	PARTMENT	PROCESS	
Part I	No.					Rework Scrap Use-as-is		r	Skid-tube Machining noforming	Crosstube Small Fab Finishing	1	Water Jet d. Eng. Coor. re/Packaging	Engineering Quality Other
NCR I	No.					Work Order Update]		Large Fab	Composite		Supplier	
Root	ĺ				Descri	ption of work order update		Initial	Ac	tion	Sign &		
Cause		Date	Step	Qty	(or Non-conformance	Ch	nief Eng	Desc	ription	Date	Verification	QC Inspector
Doc/Data													
Equip/Tooling													
Operator													
Material													
Setup									1		,		
Other													
Process	П	i											
Supplier	П												
Training	П												
Unapproved	П												
						F	AUL	T CATE	GORY				· · · · · · · · · · · · · · · · · · ·
Landi	ng G	iear				General							
		Bending				Bend		Grain			Ovalized		Pressure/Forced
• *		Centre No	t Concen	ntric to (o/s	BOM/Route		Hardwa	re		Over/Under	tolerance	Temperature/Cure
	П	Cracks				Broken/Damaged Inspection Incomplete					Part Incorred	ļ	Weld
	П	Crushed/0	Crimped.			Burrs	Instructions Incomplete/Unclear Part Lost/Missin						Wrong Stock Pulled
Cuffs Contamination						Mainte	•		Part Moved	·			
	П	Heat Trea	t			Countersink	Mislabeled Positioned Wrong			Vrong			
	Inspection Strip in Tube Cut Too Short Misread						<u> </u>	Power Loss/		Other			

Offset

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Torque Waves in Extrusion

Drill Holes

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Required Date: 04/09/2012

21/08/2012

Start Qty: 1.00

Req'd Qty: 1.00

Process Plan: Date:

QC: _____ Date:___

QC14- Inspect Spray Paint

QC6- Inspect dimensions to drawing

Memo

0.00

Operation

Description

Crosstubes

Start Date:

Reference:

Approvals:

Sequence ID/

210

Quality Control

220 Crosstubes

Crosstubes

210

220

230

QC

Quality Control

Work Center ID

		890)4/						•	Page 6
		Accept	*N900	<u>040</u>	100)*	Setup	Start Stop	171.	S1* S2*
y: 1.00 ty: 1.00	*1* *1*		Cust Item l Customer:	D:						
	nte:			ate:		1	Run	Start Stop	1/1	R1* R2*
n on ect Spray Paint		Set Up/ Run Hours	Tool ID	Tool#	Plan Code	Accept Qty	Rej Qty		Reject Number	Insp. Stamp
Memo Then, Wrap in plas	tic bag to protect f	0.00					<u>-</u>			Phos
		0.00				40				
Memo I-Abrade mating s clean the area with	surfaces of support 14105S wash 'n' w	0.00 and crosstube with 400 grii	t sandpaper,			AJ	. ——	12-	8-30)
	with Proseal 890 p	er DSI9563 and QSI 015							,	
3- Torque bolts as		0.00								<u> </u>

	<u>A</u>	
NCR:	(Yes)	No

WORK ORDER NON-CONFORMANCE / UPDATE

1.1		•	*
	غر ر		
DQA: Date:	12/09/13		•
/	10110		
	,		

										QA Closed:	Date:	
Work Orde	er:	104	7		DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	•
	vo. <u>DZVZ</u>				Rework Scrap Use-as-is Work Order Update		N Therm	Skid-tube Machining oforming Large Fab	Crosstube Small Fab Finishing Composite	Pro	Water Jet d. Eng. Coor. re/Packaging Supplier	Engineering Quality Other
Root				Descri	ption of work order update	lni	itial	Ac	tion	Sign &		
Cause	Date	Step	Qty	(or Non-conformance	Chie	f Eng	Desc	ription	Date	Verification	QC Inspector
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training Unapproved	The state of the s	如如	61	tape (Window Shill tock	was put un unspecta when the Pairin was in. Cowing marks /hi. the Pairin	3 052	5 2 041 041 041	Finish is Boff entire le per as	i rube 1500 for T 2004	120819	1204.29	QSZ042 12/08/27
			<u> </u>	-		FAULT	CATEG	GORY		1	<u> </u>	
Landir	ng Gear				General							
Centre Not Concentric to O/S Cracks Broker Crushed/Crimped. Cuffs Contan Heat Treat Inspection Strip in Tube Ripples in Bend Torque Waves in Extrusion BOM/I Broker Burrs Contan Counta Counta Drill Heat Drawin					Contamination Countersink Cut Too Short Drill Holes Drawing	H Ir	nstruction Mainter Mislabel Misread Offset Out of Co	on Incomplete ons Incomplete/ nance led alibration	Unclear	Ovalized Over/Under Part Incorred Part Lost/Mi Part Moved Positioned V Power Loss/	ct sissing Vrong	Pressure/Forced Temperature/Cure Weld Wrong Stock Pulled Other
	Turning S Wave/Tw	•		1	Finish Folio	Out of Sequence						

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August-21-12 10:36:46 AM Item 1D: D212-664-101 Accept *N900040100* Setup Start *NC1* **Revision ID:** Crosstube Fwd High Item Name: Start Qty: 1.00 **Start Date:** 21/08/2012 **Cust Item ID: Req'd Qty:** 1.00 **Required Date:** 04/09/2012 **Customer:** Reference: Run Process Plan: Date: **Approvals:** Tooling: Date: Stop Date: SPC (Y/N): Date: Sequence ID/ Operation Reject Reject Set Up/ Tool ID Tool # Plan Accept Insp. **Work Center ID** Description Code Qty Qty Number Stamp Run Hours 240 Pick Kit 0.00 *240* Packaging 0.00 Memo Packaging 250 QC4-100% Inspect kits for completeness 0.00 QC 0.00 Memo Quality Control 260 0.00 Packaging *260* Packaging 0.00 Memo Packaging Identify and pack for shipping as per PPP D212-664-101

											DQA	:Date	:
NCR:	Yes	/ No				WORK ORDER NON-	COI	NFORM	MANCE / UP	DATE	OA Classed		
						·		·			QA Closed	: Date	:
Work Ord	er:					DISPOSITION				AGAINST DI	EPARTMENT	T/PROCESS	
Part I	No					Rework Scrap Use-as-is Work Order Update		l Therm	Skid-tube Machining noforming Large Fab	Crosstube Small Fab Finishing Composite		Water Jet od. Eng. Coor. ore/Packaging Supplier	Engineering Quality Other
Root					Descri	ption of work order update		Initial	Ac	tion	Sign &		
Cause		Date	Step	Qty		or Non-conformance	Ch	nief Eng	Desc	ription	Date	Verification	QC Inspector
Doc/Data Equip/Tooling Operator Material Setüp Other Process Supplier Training Unapproved													
						F	AUL	T CATE	GORY				
Landi		Bending Centre No Cracks Crushed/G		ntric to	O/S	General Bend BOM/Route Broken/Damaged Burrs		Instruct	on Incomplete ions Incomplete/	'Unclear	Ovalized Over/Unde Part Incorre	ect 1issing	Pressure/Forced Temperature/Cure Weld Wrong Stock Pulled
		Heat Trea Inspection	n Strip in	Tube		Contamination Countersink Cut Too Short		Mainte Mislabe Misread	led		Part Moved Positioned Power Loss	Wrong	Other
	Ιl	Ripples in	Bend		1	Drill Holes	1	Offset					

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Torque Waves in Extrusion

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Quality Control

August-21-12	10:36.46 AM										
Item ID: Revision ID:	D212-664-1	01	•	Accept	*N900	040	100) *	Setup Sta	rt *N	S1*
Item Name:	Crosstube Fw	d High							Sto	^p *N	S2*
Start Date: Required Date Reference:	21/08/2012 e: 04/09/2012	Start Qty: 1.00 Req'd Qty: 1.00	*1* *1*		Cust Item I Customer:	D:					
Approvals:	Process Pla	an:	Date:	Tooling:	D:	ate:			Run Sta	rt *N	R1*
	QC:		Date:	SPC (Y/N):	D	ate:			Sto	*N	R2*
Sequence ID/ Work Center	ID	Operation Description		Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
270		QC21- Final Inspection -	Work Order Release	0.00						1	1

0.00

Memo

12/9/1298 MF 12-01-01

NCR:	Yes	/ No	•			WORK ORDER NON-C	COI	NFOR	MANCE / UPI	DATE			
		-					· · · · · · · · · · · · · · · · · · ·			QA Closed:	Date:		
Work Orde	er:					DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	
Part N	•					Rework Scrap		ſ	Skid-tube Machining	Crosstube Small Fab	4	Water Jet	Engineering Quality
NCR I	۷o.					Use-as-is Work Order Update]	B	noforming Large Fab	Finishing Composite	Rec/Sto	re/Packaging Supplier	Other
Root					Descri	ption of work order update		Initial 🕟	Act	tion	Sign &		
Cause		Date	Step	Qty	•	or Non-conformance	Ch	nief Eng	Descr	ription	Date	Verification	QC Inspector
Doc/Data	Ш												
Equip/Tooling													1
Operator										•		1	
Material													
Setup													
Other											1	ļ	
Process													
Supplier	Ш					•							
Training													
Unapproved											<u> </u>		
						F	AUL	T CATE	GORY				
Landi	ng G	Sear				General		-			_		_
	${f -}$	Bending				Bend		Grain			Ovalized		Pressure/Forced
	Ш	Centre No	t Concer	itric to (o/s	BOM/Route		Hardwa	re		Over/Under	tolerance	Temperature/Cure
	Ш	Cracks				Broken/Damaged		Inspecti	on Incomplete		Part Incorre	ct	Weld
		Crushed/0	Crimped.			Burrs	L	Instruct	ions Incomplete/l	Jnclear	Part Lost/M	issing	Wrong Stock Pulled
	Cuffs Contamination					Contamination		Mainte	nance		Part Moved	•	_
	Heat Treat Countersink Mislab						Mislabe	led		Positioned \	Nrong	•.,	
		Inspection	Strip in	Tube		Cut Too Short		Misreac	I		Power Loss,	/Surge	Other
		Ripples in	Bend			Drill Holes		Offset					
		Torque W	aves in E	xtrusio	າ [Drawing		Out of C	Calibration				
Turning Sequence Finish						•	Out of S	equence					
Wave/Twist in Tube Folio						Folio	Outside Dimensions						

DQA:

Date:

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Picklist Print

August-21-12 10:36:50 AM

Work Order ID: 89047

89047

Parent Item:

D212-664-101

D212-664-101

Parent Item Name: Crosstube Fwd High

Start Date: 21/08/2012

Required Date: 04/09/2012

Start Qty: 1.00

Required Qty: 1.00

Comments:

IPP Rev:E04.02.16ReformatKJ/DS

IPP Rev:F 06-03-29

Remove Coments on Pick List JLM

IPP Rev:G 07-04-30 As per Rev C

JLM

IPP Rev:H

11.04.26 inspection strip ecn 11-549 EC verified by:DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	-	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-101TRN		Manufactured	No		-		110	Each	7.0000	1	1			
D212_66/	1_101TE	NI								**				

Crosstube Turning Detail

ocation	Loc Oty	Loc Code			
G046	-1				
68584	0				
87556	1			•	
.G	8				
87554	1		110	1-1	
87557	1		1010	12/8/21	1
87560	1			, 0, - (
87561	1			3	
87562	1			1	
87563	1			-	
87554 87557 87560 87561 87562	1 1 1 1 1		MO	12/8/2	, 21

											DQA:	Date:	
NCR:	Yes	/ No				WORK ORDER NON-	MANCE / UP	DATE					
		·							•		QA Closed:	Date:	
Work Ord	or.					DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	
WORKOIU	C1.					Rework	7		Skid-tube	Crosstube	7	Water Jet	Engineering
Part	Nο					Scrap		i e	Machining	Small Fab	Pro	d. Eng. Coor.	Quality
						Use-as-is	1	1	noforming	Finishing	4	re/Packaging	Other
NCR	No.					Work Order Update			Large Fab	Composite	1	Supplier	
						·	_		·	· •	.		
Root					Descri	ption of work order update		Initial	Ac	tion	Sign &		
Cause		Date	Step	Qty		or Non-conformance	Cr	nief Eng	Desc	ription	Date	Verification	QC Inspector
Doc/Data													
Equip/Tooling													
Operator													
Material			ŀ										
Setup			ļ										
Other													ļ
Process							1						
Supplier	L				,								
Training													
Unapproved													
						F	AUI	T CATE	GORY				
Land	ing (Gear				General					_		•
		Bending				Bend	L	Grain			Ovalized		Pressure/Forced
	L	Centre N	ot Concer	ntric to	o/s	BOM/Route		Hardwa	re		Over/Under	tolerance	Temperature/Cure
	L	Cracks				Broken/Damaged		Inspecti	on Incomplete		Part Incorre	ct	Weld
		Crushed/	Crimped.			Burrs		Instruct	ions Incomplete/	'Unclear	Part Lost/M	issing	Wrong Stock Pulled

Maintenance

Out of Calibration

Out of Sequence

Outside Dimensions

Mislabeled

Misread

Offset

Part Moved

Positioned Wrong

Power Loss/Surge

Other

Contamination

Countersink

Cut Too Short

Drill Holes

Drawing

Finish

Folio

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Cuffs

Heat Treat

Inspection Strip in Tube

Torque Waves in Extrusion

August-21-12 10:36:50 AM

Work Order ID: 89047

Parent Item:

89047 D212-664-101

Parent Item Name: Crosstube Fwd High

D212-664-101

Start Date: 21/08/2012

Required Date: 04/09/2012

Start Qty: 1.00

**

Required Qty: 1.00

Al 12-8-30

D3595-063-450

Manufactured

230

Each

Loc Qty

0.28

0.28

154.7

1.7

130

20

2

6

0.56

0.2

0.349474

10.109474

3

165.0895

4.210526

RUBBER CUSHION

88916 Location LG

82511

80161

84715

87478

87958

67353

68893

70113

71354

74113

LG051

MAT052.

Loc Code

75597 MS21920-25 Purchased No 220 Each

MS21920-25

Clamp(per MIL-DTL-8783C)

72.0000 **

<u>Location</u>	Loc Qty	Loc Code	
LG050	72		
116264	2		
117998	4		
118142	4		
119339	2		
119746	2		
120475	7		
120920	46		
122204	5		

G	9
_	

												DQA:	Dat	te:	^
NCR:	Yes	/ No				WORK ORDER NON-	COI	NFORM	MANCE / UP	DATE				•	
		·									QA CI	osed:	Dat	te:	
Work Ord	or:					DISPOSITION				AGAINST D	PARTN	ΛENT,	/PROCESS		
Part I	No. _.					Rework Scrap Use-as-is Work Order Update	1	f Therm	Skid-tube Machining noforming Large Fab	Crosstube Small Fab Finishing Composite	Re		Water Jet d. Eng. Coor. re/Packaging Supplier		Engineering Quality Other
Root					Descri	ption of work order update		Initial	Ac	tion	Sigr	ո &			
Cause		Date	Step	Qty	C	or Non-conformance	Cr	nief Eng	Desc	ription	Da	te	Verification	n	QC Inspector
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training Unapproved													. ,		
<u> </u>						General	AUI	LT CATE	JORY						
Landi	Bending Centre Not Concentric to O/S Broken/Damaged Crushed/Crimped. Burrs Cuffs Contamination Heat Treat Inspection Strip in Tube Bend BOM/Route Broken/Damaged Contamination Contamination Countersink Cut Too Short							Instruct Mainte Mislabe Misread	ion Incomplete ions Incomplete/ enance eled	'Unclear	Ovaliz Over/ Part Ir Part L Part N Positio	Under ncorre ost/M Noved oned N	issing Wrong		Pressure/Forced Temperature/Cure Weld Wrong Stock Pulled Other
	1	Ripples in	Bend			Drill Holes		Offset							

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Torque Waves in Extrusion

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Picklist Print

August-21-12 10:36:50 AM

Work Order ID: 89047 Parent Item:

D212-664-101

89047

D212-664-101

Parent Item Name: Crosstube Fwd High

Start Date: 21/08/2012

Required Date: 04/09/2012

Start Qty: 1.00

Required Qty: 1.00

D2893-1

Manufactured

220

Each

Each

2.0000

Loc Code

2 **

12-8-30

D2893-1

2.75 Support

D3428-1

Location LG052

No

No

72865

88702

2 2

240

Loc Oty

14.0000

**

AN6-35A

Purchased No

Manufactured

ST042 83582 85228

Location

2 12 240 Each

Loc Qty

14

86.0000 **

Loc Code

3

Location Loc Qty 342 121181 ST340 85 122416 85

Loc Code

SL

												DQA:	Da	ate:	,
NCR:	Yes	/ No				WORK ORDER NON-C	COI	VFORM	MANCE / UP	DATE		•		•	4
		· · · · · · · · · · · · · · · · · · ·										QA Closed:) Da	ate:	
Work Ord	er:					DISPOSITION				AGAINST	DE	PARTMENT	PROCESS		
Part I	Part No. NCR No.					Rework Scrap Use-as-is Work Order Update		Therm	Skid-tube Machining noforming Large Fab	Crosstube Small Fab Finishing Composite			Water Jet d. Eng. Coor e/Packaging Supplier		Engineering Quality Other
Root					Descri	ption of work order update		Initial	Ac	tion		Sign &			
Cause		Date	Step	Qty	,	or Non-conformance	Ch	ief Eng	Desc	ription		Date	Verificatio	n	QC Inspector
Doc/Data							Π								
Equip/Tooling															
Operator															
Material															
Setup							1								
Other														i	
Process								i							
Supplier															
Training -															
Unapproved															
			,			F.	AUI	T CATE	GORY						
Landi	ng C	Gear				General		_		_		_			
		Bending				Bend		Grain				Ovalized			Pressure/Forced
		Centre No	ot Concer	ntric to	o/s	BOM/Route		Hardwa	re			Over/Under	tolerance		Temperature/Cure
		Cracks				Broken/Damaged		Inspecti	on Incomplete			Part Incorre	ct		Weld
		Crushed/0	Crimped.			Burrs		Instruct	ions Incomplete	/Unclear		Part Lost/Mi	ssing		Wrong Stock Pulled
		Cuffs			Г	Contamination		Mainte	nance			Part Moved			-

Mislabeled

Out of Calibration

Out of Sequence

Outside Dimensions

Misread

Offset

Positioned Wrong

Power Loss/Surge

Other

Countersink

Cut Too Short

Drill Holes

Drawing

Finish

Folio

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Heat Treat

Inspection Strip in Tube

Torque Waves in Extrusion

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Picklist Print

August-21-12 10:36:50 AM

Work Order ID: 89047

Parent Item:

`AN6-36A

D212-664-101

Parent Item Name: Crosstube Fwd High

89047

D212-664-101

118927

119075

120308

Start Date: 21/08/2012

Required Date: 04/09/2012

Start Qty: 1.00

Required Qty: 1.00

(*AN6-36A*

Purchased

Purchased

No

No

240

Each

87.0000

0.0000

4

**

Location	Lo	Loc Code	
ST340		77	
122416		77	
ST342		10	
118422		2	
119449		1	
120187		4	
120423		3	
	240	Each	875.0000

**

MS21042L6 *MS2104216*

Location Loc Oty Loc Code 314 584 122441 584 ST300 291 117677 25 118384 3

240

48

15

200

Each

18 18

AN960JD616

NAS1149D0663J Purchased

No

**

M122452 8LC 12/9/06

August-21-12 10:36:51 AM

Shop Packet Print

Page 4

NCR:	NCR: Yes / No WORK ORDER NON-CONFORMANCE / UPDATE QA Closed: Date:												
Work Ord	er:					DISPOSITION				AGAINST DE			
Part No						Rework Scrap Use-as-is Work Order Update		Skid-tube Crosstu Machining Small F Thermoforming Finish Large Fab Compos			Pro Rec/Sto	Engineering Quality Other	
Root	Desc					ption of work order update		Initial	Act	tion	Sign &		
Cause		Date	Step	Qty		or Non-conformance	Ch	nief Eng	Desci	ription	Date	Verification	QC Inspector
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training Unapproved					,								
						·	AUI	LT CATE	GORY				
Land	ing (7				General		-	· · · · · · · · · · · · · · · · · · ·		.		¬
	\vdash	Bending			~ -	Bend BOAA/Bassta	-	Grain		<u> </u>	Ovalized		Pressure/Forced
	\vdash	Centre N	ot Concei	ntric to (^{5/5} -	BOM/Route	\vdash	Hardwa			Over/Under	-	Temperature/Cure
	\vdash	Cracks	الاحتصمما		-	Broken/Damaged	-	-	on Incomplete	l In al a an	Part Incorre	⊢	Weld Wrong Stock Pulled
	-	Crushed/ Cuffs	Crimpeo,			Burrs	\vdash	Mainte	ions Incomplete/	Uniciear	Part Lost/M Part Moved	Issing	
	-	Heat Trea	at		\vdash	Contamination Countersink	.	Mislabe		<u> </u>	Positioned \	Vrong	
	\vdash	Inspectio		Tubo	-	Cut Too Short	\vdash	Misread		-	Power Loss/		Other
	-	Ripples in		Tube	-	Drill Holes	\vdash	Offset	ı	L	Trower ross/	ouige [Tottlei
		Torque V		xtrusio	, -	Drawing	-	4	Calibration				

Out of Sequence

Outside Dimensions

DQA:

Date:

Turning Sequence

Wave/Twist in Tube

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

DART AEROSPACE LTD	Work Order:	89047
Description: Crosstube High Fwd (205/212/412)	Part Number:	D212-664-101
Inspection Dwg: D212-664-141 Rev: D		Page 1 of 1

	Required Dimension	Min	Max	
	Height	26.79	27.05	
	1/2 Span	53.59	53.85	
	Angle	49	52	
	Total Span	107.18	107.7	
	Bending Passes	3		
	Crushing		6%	
, 1	97-7.853 4.07	ļ.	·711 = 4.842	,
			1700	
2600	- 53.85 ⁰	5 5	7.527 2-316	50.1 Z6.900 N

4.3%									
Crushing 4.0/2 4.3/2 Comments									
·/) [·]									

	QC15 Inspection	1000
	QO TO THISPECTION	40
1	Data	10 ,1 ()
	Date	10017
		<u> </u>

Rev	Date	Change	Revised by	Approved
Α	07.02.06	New Issue	KJ/JM	
В	08.04.21	Dwg Rev updated	KJ/JM	
С	10.04.01	Dwg Rev updated	KJ . N.	
D	12.04.16	Added bending, crushing dimensions	KJ 🖎	W
			1/1	

											DQA:	Date	:
NCR:	Yes	/ No				WORK ORDER NON-O	100	NFORM	MANCE / UP	DATE			
											QA Closed:	Date	:
Work Ord	er:					DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	
Part No						Rework Scrap Use-as-is Work Order Update	Scrap Machining Small Fab Use-as-is Thermoforming Finishing			Crosstube Small Fab Finishing Composite	1	Water Jet d. Eng. Coor. re/Packaging Supplier	Engineering Quality Other
Root					Descri	ption of work order update		Initial	Ac	tion	Sign &		
Cause		Date	Step	Qty	(or Non-conformance	Ch	nief Eng	Desc	ription	Date	Verification	QC Inspector
Doc/Data													
Equip/Tooling													
Operator							1						
Material			1										
Setup	L												
Other	L												
Process			ļ								4. 4.		
Supplier	\Box												
Training							1						
Unapproved													
						F	AUL	T CATE	GORY				
Land	ing (1			_	General		,			7	_	_
		Bending			_	Bend		Grain			Ovalized		Pressure/Forced
	<u></u>	Centre No	ot Concer	ntric to	o/s	BOM/Route	L	Hardwa	re		Over/Under	tolerance	Temperature/Cure
		Cracks				Broken/Damaged	L	4	ion Incomplete		Part Incorre	ct	Weld
	\perp	Crushed/	Crimped.			Burrs		Instruct	tions Incomplete/	/Unclear	Part Lost/M	issing	Wrong Stock Pulled
	L	Cuffs				Contamination	\perp	Mainte	nance		Part Moved		
		Heat Trea	ıt			Countersink	L	Mislabe	eled		Positioned V	Vrong	_
I		Inspectio	n Strip in	Tube		Cut Too Short		Misread	1		Power Loss/	Surge	Other

Offset

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Torque Waves in Extrusion

Drill Holes

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Item	Qty -141	Qty -141 B	Part Number	Description					
1	Х		D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)					
2		X	D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)					
3	. 1	1	D6005-128	CROSSTUBE					
4	2	2	D2893-1	SUPPORT					
5	4	4	D3595-063-450	RUBBER CUSHION					
6	4	4	MS21920-25	CLAMP (OR MS21920-26)					
7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)					

GENERAL NOTES:

D

1) MATERIAL: MANUFACTURED FROM D6005-128 FINISHED LENGTH = 126.514±0.020

CHEMICAL CONVERSION COAT PER DART QSI 005 4.1 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2

PAINT OUTSIDE PER DART QSI 005 4.2

3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED

UNITS: INCHES UNLESS OTHERWISE NOTED. BREAK SHARP EDGES: 0.005 TO 0.010 MAX.

IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS

WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664) D212-664-141B = 33.6 lbs (PER IIN-D212-664)

PART IS SYMMETRIC ABOUT CENTERLINE.

9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH.

10) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.

11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.

12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.

13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT

14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY RETURN TO ENGINEERING UNCONTROLLED COPY SUBJECT TO AMENDMENT WITHOUT NOTICE WORK ORDER MLJ 12/08/21

REHOVED FROM UNDER REVIEW PER UNDER REVIEW SCHILL-GIA

DEO ATTACHED

D	REORG TO CUR REMOV & B6-3); MOVED	REFORMAT/REVISE GENERAL NOTES/PART LIST; REPOGRAI/IZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -1418 (ZN 84-2, D4-2); REMOVED REF & ADD TOLERANCES (ZN 84-3, C6-3, C8-3 & 86-3); REJOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4									
С			SION STRIP; ADD MAGNOBOND /ERSE CLAMPS	PH	07.03.08						
В.	ADD H	OLES FOR CO JBES	PH	05.02.04							
A	NEW IS	SSUE	PH	00.12.12							
REV.			DESCRIPTION	BY	DATE						
DESIGN		PH	DART AFROSP	DART AEROSPACE LTD							
DRAWN		RF	HAWKESBURY, ONTARI								
CHECKE	ED	q)	DRAWING NO.		REV. D						
MFG. AF	PR.	187	D212-664-141	s	HEET 1 OF 4						
APPRO\	/ED	140	TITLE		SCALE						
DE APPI	₹		XTUBE ASS'Y (205/212/412 HI FWD) NTS								
DATE	09.0	9.30	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONTRIBENTIAL AND IS SIPPLIED ON THE DOPRESS CONTRION THAT IT IS NOT TO BE USED FOR ANY MEROES OR COMPANIESTED TO ANY OTHER PERSON WITHOUT								

											DQA	: Date:				
NCR:	Yes	/ No				WORK ORDER NON-O	100	NFOR	MANCE / UP	DATE						
											QA Closed	: Date:				
Work Order:						DISPOSITION		AGAINST DEPARTMENT/PROCESS								
Part No						Rework Scrap Use-as-is Work Order Update	Machining Small F Thermoforming Finish			Crosstube Small Fab Finishing Composite	Water Jet Prod. Eng. Coor. Rec/Store/Packaging Supplier		Engineering Quality Other			
Root			1		Descri	ption of work order update		Initial	Δ.	tion	Sign &	T				
Cause		Date	Step	Qty	i e	or Non-conformance	1	nief Eng		ription	Date	Verification	QC Inspector			
Doc/Data			•				T			•			•			
Equip/Tooling																
Operator	Ш						1									
Material	Ш									•						
Setup																
Other	Ш			·												
Process	Ш															
Supplier	Ш															
Training																
Unapproved																
						F	AUL	T CATE	GORY							
Landi	ng (Gear				General		_					_			
		Bending				Bend		Grain			Ovalized	<u> </u>	Pressure/Forced			
		Centre No	ot Concer	ntric to	o/s	BOM/Route		Hardwa	are		Over/Unde	r tolerance	Temperature/Cure			
		Cracks				Broken/Damaged	Г	Inspect	ion Incomplete		Part Incorrect Weld					

Maintenance

Out of Calibration

Out of Sequence

Outside Dimensions

Mislabeled

Misread

Offset

Instructions Incomplete/Unclear

Part Lost/Missing

Positioned Wrong

Power Loss/Surge

Part Moved

Wrong Stock Pulled

Other

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Crushed/Crimped.

Inspection Strip in Tube

Torque Waves in Extrusion

Cuffs

Heat Treat

Burrs

Contamination Countersink

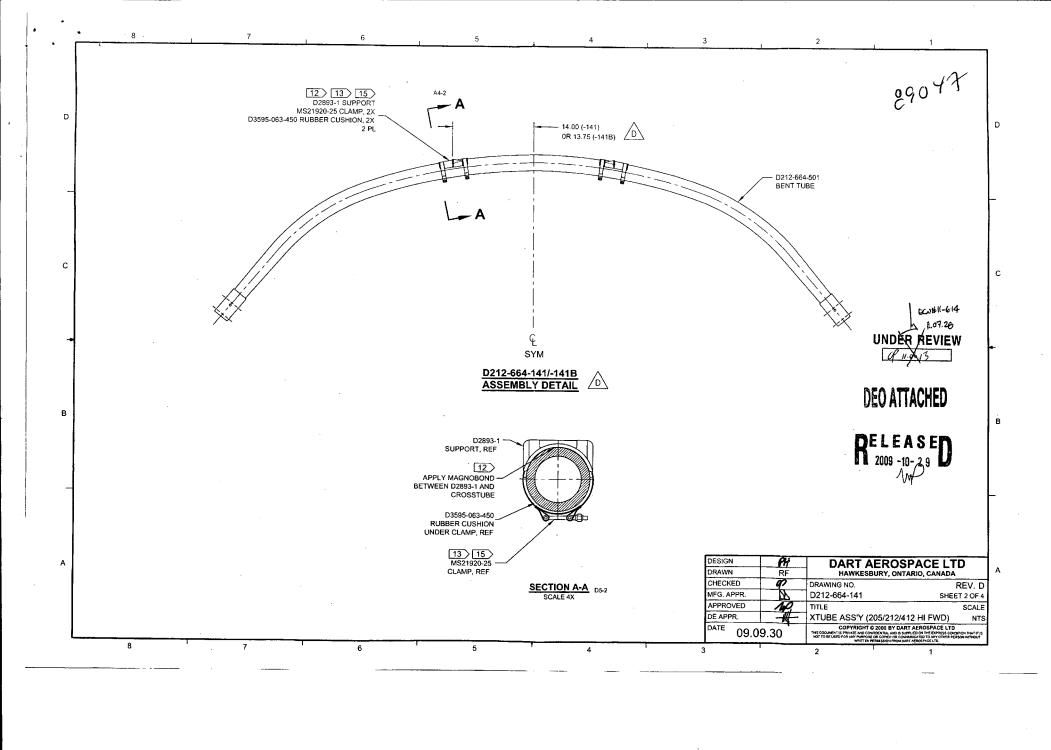
Cut Too Short

Drill Holes

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

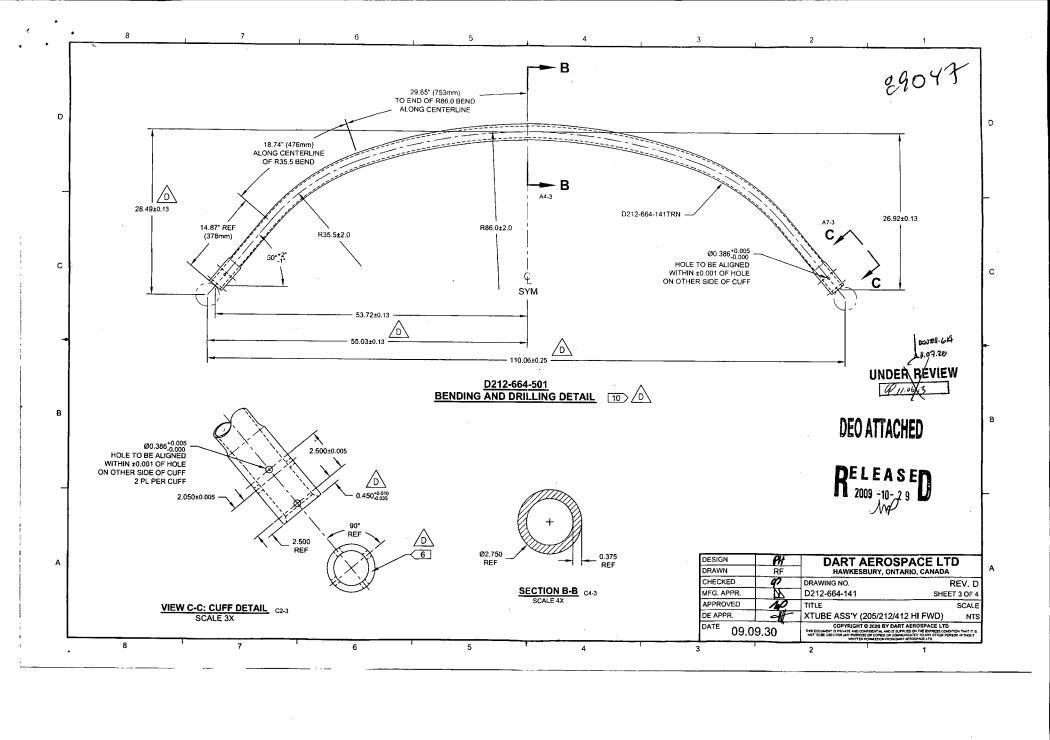


										DQ	4 : Dat	e:	
NCR: Y	'es	/ No				WORK ORDER NON-	CO	VFOR	MANCE / UPDATE				
										QA Close	d: Dat	e:	
Work Orde	er:					DISPOSITION			AGAINST	DEPARTMENT/PROCESS			
	•					Rework			Skid-tube Crosstube		Water Jet	Engineering	
Part N	10.					Scrap	_		Machining Small Fab	— 4	rod. Eng. Coor.	Quality	
NCR No.						Use-as-is Work Order Update		Thern	noforming Finishing Large Fab Composite	Rec/s	ore/Packaging Supplier	Other	
Root					Descr	ription of work order update		Initial	Action	Sign &			
Cause		Date	Step	Qty		or Non-conformance	Ch	nief Eng	Description	Date	Verification	QC Inspector	
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Landir	_	1				General .		1		<u> </u>	Г		
		Bending			_ -	Bend	-	Grain		Ovalized	. ,	Pressure/Forced	
		Centre No	t Concer	ntric to	o/s	BOM/Route	\vdash	Hardwa		—	er tolerance	Temperature/Cure	
		Cracks			<u> </u>	Broken/Damaged	-	4 `	ion Incomplete	Part Incor		Weld	
ļ		Crushed/0	Crimped.		<u> </u>	Burrs	-	4	ions Incomplete/Unclear	Part Lost/	L	Wrong Stock Pulled	
		Cuffs			<u> </u>	Contamination	-	Mainte		Part Mov			
		Heat Trea				Countersink	_	Mislabe		Positione			
	$\overline{}$	Inspection		Tube		Cut Too Short	_	Misrea	d	Power Lo	ss/Surge	Other	
}		Ripples in			<u> </u>	Drill Holes	-	Offset	-				
		Torque W		xtrusio	າ	Drawing	<u> </u>	4	Calibration				
		Turning Se	equence			Finish		Out of Sequence					

Outside Dimensions

Wave/Twist in Tube

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

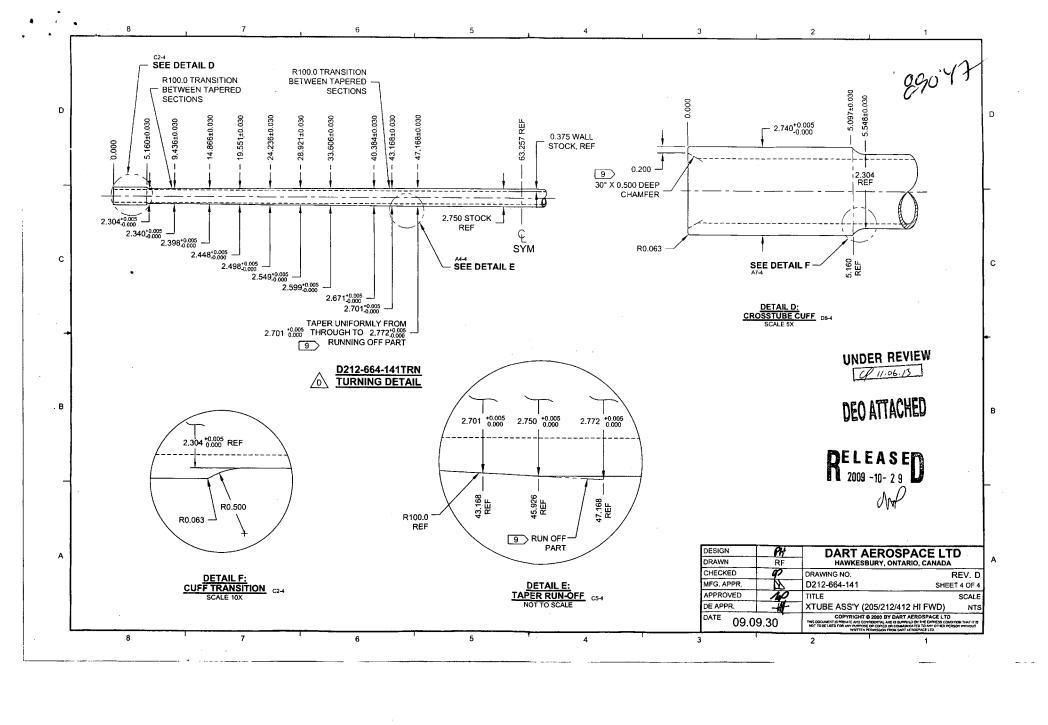


											DQA:	Date	:	
NCR:	es/	/ No				WORK ORDER NO	N-CON	NFORM	ANCE / UPDATE					
											QA Closed:	Date	:	
Work Orde	er:					DISPOSITION			AGAIN	ST DE	PARTMENT	/PROCESS		
Part N						Rework Scrap Use-as-is		1	Skid-tube Crosstu Machining Small F noforming Finishi	ab	Pro Rec/Stor	Engineering Quality Other		
NCR I	۱o.					Work Order Update			Large Fab Composi	ite		Supplier		
Root					Descr	ription of work order update	e 1	nitial	Action		Sign &			
Cause		Date	Step	Qty		or Non-conformance	Ch	ief Eng	Description		Date	Verification	QC Inspector	
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Landi	ng (1			_	General		۱		Γ	1	Г	¬_	
	_	Bending			- L	Bend		Grain		\vdash	Ovalized		Pressure/Forced	
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	_	Cracks			_	Broken/Damaged	\vdash		on Incomplete	-	Part Incorre	 	Weld	
	_	Crushed/0	Crimped.		-	Burrs		1	ions Incomplete/Unclear	 	Part Lost/M	issing	Wrong Stock Pulled	
		Cuffs			<u> </u> -	Contamination		Mainte		-	Part Moved	• •		
	Heat Treat Countersink						—	Mislabeled Positioned Wrong						
	Inspection Strip in Tube Cut Too Short						-	Misread Power Loss/Surge Other						
	Ripples in Bend Drill Holes Torque Waves in Extrusion Drawing							Offset						
:		ł		xtrusio	` -	Drawing	-	Out of Calibration						
		Turning Se	equence			Finish		Out of Sequence						

Outside Dimensions

Wave/Twist in Tube

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G



											DQA:	Date:	
NCR:	Yes	/ No				WORK ORDER NON-C	100	NFORM	MANCE / UPDATE		•		
	_										QA Closed:	Date:	
Work Ord	or.					DISPOSITION			AG	AINST DE	PARTMENT	PROCESS	
Part I	-		,			Rework Scrap		ı	Machining Sma	sstube		Water Jet	Engineering Quality
NCR I	No					Use-as-is Work Order Update		Thern	~ 	posite	Rec/Stor	e/Packaging Supplier	Other
Root	ŀ				Descri	ption of work order update	ı	nitial	Action		Sign &		
Cause		Date	Step	Qty	(or Non-conformance	Ch	ief Eng	Description		Date	Verification	QC Inspector
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Operator							1						
Material	Ш												
Setup													
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Landi	ng G	ear				General		_			_		_
		Bending				Bend		Grain			Ovalized		Pressure/Forced
		Centre No	t Concer	ntric to	o/s	BOM/Route		Hardwa	re		Over/Under	tolerance	Temperature/Cure
		Cracks				Broken/Damaged		Inspect	on Incomplete		Part Incorre	ct	Weld
	Crushed/Crimped Burrs					Burrs		Instruct	ions Incomplete/Unclear		Part Lost/Mi	ssing	Wrong Stock Pulled
	Cuffs Contamination					Contamination					Part Moved	_	_
		Heat Trea	t			Countersink		Mislabe	eled		Positioned V	Vrong	

Misread

Out of Calibration

Out of Sequence

Outside Dimensions

Offset

Other

Power Loss/Surge

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Inspection Strip in Tube

Torque Waves in Extrusion

Cut Too Short

Drill Holes

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

DRAWING NO.	TITLE		REV. D	DART AE	ROSPACE LTD	D.E.O. NO	,	SHEET NO.	SCALE
D212-664-141	XTUBE ASS	Y (205/212/412 HI	FWD)	ENGINE	ERING ORDER	D212-66	4-141 <u>-</u> D-1	SHEET 1 OF 2	NTS
DRAWN		CHECKED	P	MFG. APPR.	E	APPROVED	NA,	DE APPR.	
DATE 11.04	.07	DATE)	1,4),11	DATE	11.04.12	DATE	11/04/12	DATE 11.04	.12

PURPOSE:

ADD AN INSPECTION WINDOW TO UNDERSIDE OF CROSSTUBE.

CHANGE:

NOTES 2 OF SHEET 1 IS AMENDED AS FOLLOWS:

<u>IS:</u>

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2

MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND

PAINT OUTSIDE PER DART QSI 005 4.2 REMOVE MASKING AND APPLY CLEAR COAT

WAS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2

PAINT OUTSIDE PER DART QSI 005 4.2

NCR:	Yes	/ No				WORK ORDER NON-	COI	NFORM	MANCE / UP	DATE			
											QA Closed:	Date	•
Work Ord	ler:					DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	
Part	No.					Rework Scrap Use-as-is	Therm	Skid-tube Machining noforming	Crosstube Small Fab Finishing	Pro Rec/Sto	Engineering Quality Other		
NCR	No.					Work Order Update		Large Fab	Composite		Supplier		
Root Cause		Date	Step	Qty		ption of work order update	Initial Action nief Eng Description			Sign & Date	Verification	QC Inspector	
Doc/Data	T^{\dagger}	Date	эсер	Qty		or won comormance							Qe inspector
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Operator	·H												
Material	H						į						
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Other	H												
Process	H												
Supplier	H									:			
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Land	ing G	ear				General	7101						
		Bending				Bend	Г	Grain			Ovalized	Г	Pressure/Forced
	-	_	ot Concer	ntric to O	/s	BOM/Route	-	Hardwa	re		Over/Under	tolerance	Temperature/Cure
	Centre Not Concentric to O/S Cracks					Broken/Damaged	\vdash	-{	on Incomplete	<u> </u>	Part Incorre	 	Weld
	Crushed/Crimped.					Burrs	\vdash	-1	ions Incomplete/	l Inclear	Part Lost/M	-	Wrong Stock Pulled
	Cuffs					Contamination	\vdash	Mainte	•		Part Moved	_	
	Heat Treat					Countersink	-	Mislabe		<u> </u>	Positioned		
	Inspection Strip in Tube					Cut Too Short	\vdash	Misread			Power Loss,	_	Other
	\vdash	•		TUDE		Drill Holes	\vdash	Offset	•	L.	J. OWEL 1033,	Juige	Tother
	Ripples in Bend Torque Waves in Extrusion					Drawing		4	Calibration				

Out of Sequence

Outside Dimensions

DQA:

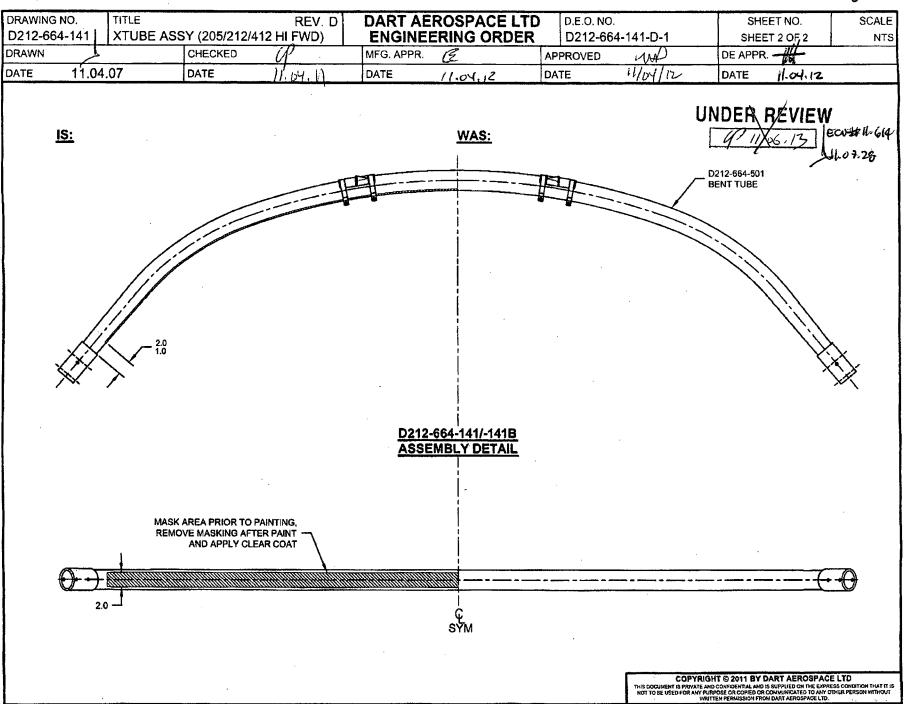
Date:

Turning Sequence

Wave/Twist in Tube

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G



												DQA:	Dat	e: _	
NCR:	Yes	/ No				WORK ORDER NON-C	O	VFOR	MANCE / UPI	DATE			.	_	
											QA CI	osed:	Dat	e:	
Work Orde	or.		•			DISPOSITION				AGAINST DE	PARTI	MENT	PROCESS		
Work Orac	-					Rework	1		Skid-tube	Crosstube	1		Water Jet	\neg	Engineering
Part f	No.					Scrap		Machining Small Fa			├			ヿ	Quality
	_				··	Use-as-is	Thern	Finishing	Re		e/Packaging	コ	Other		
NCR I	No.					Work Order Update Large Fab				Composite			Supplier		
	_														
Root					Descri	ption of work order update	1	nitial		tion	Sigi	n &			
Cause		Date	Step	Qty	(or Non-conformance	Ch	ief Eng	Desci	ription	Da	ite	Verification	\Box	QC Inspector
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Landi	ng G	ear				General		_			_				-
•		Bending				Bend		Grain			Ovaliz	zed			Pressure/Forced
	Centre Not Concentric to O/S					BOM/Route	ire		Over/	'Under	tolerance		Temperature/Cure		

Maintenance

Out of Calibration

Out of Sequence

Outside Dimensions

Mislabeled

Misread

Offset

Inspection Incomplete

Instructions Incomplete/Unclear

Broken/Damaged

Contamination Countersink

Cut Too Short

Drill Holes

Drawing

Finish

Folio

Burrs

Part Incorrect

Part Moved

Part Lost/Missing

Positioned Wrong

Power Loss/Surge

Weld

Other

Wrong Stock Pulled

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Ripples in Bend

Turning Sequence

Wave/Twist in Tube

Cracks

Cuffs

Heat Treat

Crushed/Crimped.

Inspection Strip in Tube

Torque Waves in Extrusion

DRAWING NO.	TITLE REV. D	DART AEROSPACE LTD	D.E.O. NO.	SHEET NO.	SCALE
D212-664-141	CROSSTUBE ASS'Y (205 HI FWD)	ENGINEERING ORDER	D212-664-141-D-2	SHEET 1 OF 1	NTS
DRAWN (//	CHECKED A>S	MFG. APPR.	APPROVED IN	DE APPR.	
DATE 11.07	15 DATE 11.07.20	DATE 11.07.21	DATE 11/07/21	DATE 11.07.21	

PURPOSE:

REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:

IS:

Item	Qty -141	Qty -141B	Part Number	Description
7	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023
İ			·	ADHESIVE (TEXTRON/BELL SPEC. 299-947-100,
				TYPE II, CLASS 2 ADHESIVE)

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

- 12) TO INSTALL D2893-1 SUPPORT: ABRADE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT), APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING. RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

WAS:

- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.



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												DQA:	Da	ite:	P.
NCR:	Yes	/ No				WORK ORDER NON-	100	NFORM	MANCE / UP	DATE					
												QA Closed:	Da	ite:	
Work Ord	or.	•				DISPOSITION				AGAINST	DE	PARTMENT	PROCESS		
Work Ord	ет.				<u></u>	Rework	ר		Skid-tube	Crosstube			Water Jet		Engineering
Part	No					Scrap Machining				Small Fab				Quality	
rait	10.					Use-as-is							e/Packaging	_	Other
NCR	Nο.					Work Order Update Large Fab				Finishing Composite		ince/stol	Supplier	-	
						Work order opdate	J		20180100	Composite			• ф		
Root		, , , , ,			Descri	ption of work order update		Initial	Ac	tion		Sign &			
Cause		Date	Step	Qty	(or Non-conformance	Ch	nief Eng	Desc	ription		Date	Verificatio	n	QC Inspector
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Equip/Tooling														ļ	
Operator															
Material															
Setup															
Other							1								
Process							1								
Supplier									€.						
Training															
Unapproved															
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Landi	ing (Gear			_	General		•	•			•		_	,
	├ ┤ ` ├ ┤					Bend		Grain		ļ		Ovalized		Pressure/Forced	
	Centre Not Concentric to O/S BC					BOM/Route		Hardwa	re			Over/Under tolerance			Temperature/Cure
	Cracks Broken/Damage					Broken/Damaged	Inspection Incomplete Part Incorrect				ct	L	Weld		
1		Crushed/	Crimped.			Burrs	1	Instruct	ions Incomplete/	Unclear		Part Lost/Mi	ssing		Wrong Stock Pulled

Maintenance

Out of Calibration

Out of Sequence

Outside Dimensions

Mislabeled

Misread

Offset

Part Moved

Positioned Wrong

Power Loss/Surge

Other

Contamination

Countersink

Cut Too Short

Drill Holes

Drawing

Finish

Folio

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Cuffs

Heat Treat

Inspection Strip in Tube

Torque Waves in Extrusion

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

1	·								•
DR	AWING NO.	TITLE	RI	EV. D DART A	ROSPACE LTD	D.E.O. NO).	SHEET NO.	SCALE
D2	12-664-141	XTUBE ASSY (205/212/412 HI FV	VD) ENGINE	ERING ORDER	D212-66	64-141-D-3	SHEET 1 OF 1	NTS
DRA	AWN AJS	СН	ECKED P	MFG. APPR.	10	APPROVED	16	DE APPR.	
DAT	E 12.06.	28 DA	TE 12.07.05	DATE	12.07.05	DATE	12.07.05	DATE 12.07	2.05

PURPOSE:

ADD NEW CONFIGURATION WITH ANODIZED FINISH

ADD -141F CONFIGURATION TO PARTS LIST AS SHOWN BELOW:

Item	Qty -141	Qty -141B	Qty -141F	Part Number	Description
1	Х			D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
2		Х		D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
			Х	D212-664-141F	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD) (ANODIZED)
3	1	1	1	D6005-128	CROSSTUBE
4	2	2	2	D2893-1	SUPPORT
5	4	4	4	D3595-063-450	RUBBER CUSHION
6	4	4	4	MS21920-25	CLAMP (OR MS21920-26)
7	A/R	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

*NOTE ITEM 7 HAS BEEN UPDATED IN ACCORDANCE WITH DEO D212-664-141-D-2

AMEND NOTE 2 AS FOLLOWS:

IS:

- 2) FINISH -141 & -141B ONLY: a) CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 - b) PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 - c) MASK UNDERSIDE OF CROSSTUBE AS SHOWN IN DEO D212-664-141-D-1
 - d) PAINT OUTSIDE PER DART QSI 005 4.2
 - e) REMOVE MASKING AND APPLY MATTE CLEAR COAT

FINISH -141F: a) ANODIZE PER MIL-A-8625. TYPE II. CLASS 1.

- b) ALODINE (DO NOT ETCH) PER QSI 005 4.1.2
- c) PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
- d) MASK UNDERSIDE OF CROSSTUBE AS SHOWN IN DEO D212-664-141-D-1
- e) PAINT OUTSIDE PER DART QSI 005 4.2
- f) REMOVE MASKING AND APPLY MATTE CLEAR COAT

*NOTE: BETWEEN FINISHING OPERATIONS EXTREME CARE MUST BE TAKEN NOT TO CONTAMINATE OR DAMAGE FINISHED SURACES.

WAS: (UPDATED PER DEO D212-664-141-D-1)

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN IN DEO D212-664-141-D-1
PAINT OUTSIDE PER DART QSI 005 4.2
REMOVE MASKING AND APPLY CLEAR COAT



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NCR: Y	res / N	0			WORK ORDER NON-	CON	NFOR	MANCE / UP	DATE			
										QA Closed:	Date:	
Work Orde	er:				DISPOSITION	,	٠		AGAINST DE	PARTMENT,		, <u>, , , , , , , , , , , , , , , , , , </u>
Part N					Rework Scrap Use-as-is Work Order Update			Skid-tube Machining noforming Large Fab	Crosstube Small Fab Finishing Composite	4	Water Jet d. Eng. Coor. re/Packaging Supplier	Engineering Quality Other
			1	I			Initial Action				,	
Root					ption of work order update	i	nitial			Sign &		
Cause	Dat	e Step	Qty	,	or Non-conformance	Ch	ief Eng	Desc	ription	Date	Verification	QC Inspector
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Unapproved												
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Landii	ng Gear				General							`
	Bendi	ng			Bend		Grain			Ovalized		Pressure/Forced
		Not Conce	ntric to	o/s	BOM/Route	-	Hardwa	ire		Over/Under	tolerance	Temperature/Cure
	Cracks				Broken/Damaged		Inspect	ion Incomplete		Part Incorre	ct	Weld
	Crush	ed/Crimped			Burrs		Instruct	ions Incomplete/	Unclear	Part Lost/Mi	issing	Wrong Stock Pulled
	Cuffs				Contamination		Mainte	enance		Part Moved		
	Heat 1	reat			Countersink		Mislabe	eled		Positioned V	Wrong	
	Inspection Strip in Tube				Cut Too Short		Misrea	d		Power Loss/	'Surge	Other
	Ripple	s in Bend			Drill Holes		Offset			-	<u> </u>	
	Torqu	e Waves in	Extrusio	n 🗀	Drawing		Out of	Calibration				
	Turnir	g Seguence			Finish	Out of Sequence						

Outside Dimensions

DQA:

Date:

Wave/Twist in Tube

^{&#}x27; H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

									
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TEM(S) EXAMINED								······································	
JOB DESCRIPTION	ON	PROCEDURE	No. LT600.2	REV./DATE	1 800	ECHNIQUE I	No. LT/GC/	REV./DA	TE 2008
PART No.	SE	E NES	cuts	MATE	/	14		ICKNESS	1/41 5
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TEST DETAILS		<u> </u>	76.5	70.	L NAV	<u>ں د</u>	CFMCL	0,01	<u> </u>
METHOD	A File								
FAMILY BRAND	1/4-C A)	AFLUX	☐ VISIBLI		ATER WASH	1600	SOLVENT REM	OVABLE 2	
PENETRANT	2667	MINIMUM DV	VELL TIME 451		K LIGHT S/N	ELASHICE	OUTPUT > 1000	U μ W/CM²	AMBIENT < 2 fc PUT>100 fc @ SURFAC
PENETRANT REMOVI	ER HAD	MINIMUM DR		0 Min. OTHE	R LA	ENO.	11 L TROUBLELIGE	11 🚨 0011	PUT>100 tc @ SURFAC
DEVELOPER	SKOSZ	MINIMUM DW	·		METER S/N	109	8866	CAL DU	DATE /20/13
DEVELOPER TYPE	Non Aqu	JEOUS 🗖 AQI	JEOUS 🔲	DRY					igoty
TEST SURFACE								ים	
SURFACE CONDITION	N 🔲 As Grou	INIO	D 0010/						The second secon
			AS WELDED	MA	CHINED	☐ SHOT E	BLASTED		LEAN BARE METAL
SURFACE TEMPERAT	TURE □ < - 4°C/2	20°F	☐ - 4°C/ 20°F T	0 10°C/50°F	CHINED	☐ SHOT E ■ 10°C/5	BLASTED 0°F TO 52°C/125°		LEAN BARE METAL 52°C/125°F
SURFACE TEMPERAT				O 10°C/50°F	CHINED	SHOTE 10°C/5	BLASTED 0°F TO 52°C/125°		
SURFACE TEMPERAT	TURE □ < - 4°C/2	20°F		0 10°C/50°F	CHINED	□ SHOTE 2 10°C/5	BLASTED 0°F TO 52°C/125°		
SURFACE TEMPERAT	TURE □ < - 4°C/2	20°F		0 10°C/50°F	CHINED	□ SHOT E 2 10°C/5	BLASTED 0°F TO 52°C/125°		
SURFACE TEMPERAT	TURE □ < - 4°C/2	20°F		0 10°C/50°F	CHINED	SHOTE 10°C/5	3LASTED 0°F TO 52°C/125°		
SURFACE TEMPERAT	TURE □ < - 4°C/2	20°F		0 10°C/50°F	CHINED	□ SHOT E 10°C/5	BLASTED 0°F TO 52°C/125°		
SURFACE TEMPERAT	TURE □ < - 4°C/2	20°F		0 10°C/50°F	CHINED	□ SHOT E 2 10°C/5	BLASTED 0°F TO 52°C/125°		
SURFACE TEMPERAT RESULTS- 1 - 88 1 - 88 1 - 88	TURE □ < - 4°C/2 (□ METRIC	20°F		0 10°C/50°F	CHINED	□ SHOT E 2 10°C/5	BLASTED 0°F TO 52°C/125°		
SURFACE TEMPERAT	TURE □ < - 4°C/2 (□ METRIC	Cles 35	-4°C/20°FT	0 10°C/50°F	CHINED	□ SHOT E 2 10°C/5	BLASTED :0°F TO 52°C/125°		
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